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CCXXIII.—AGAVES AND ARBORESCENT LILIACEÆ ON THE RIVIERA.

At the close of November 1891 Mr. J. G. Baker, F.R.S., keeper of the herbarium and library, paid a short visit to the gardens of the Riviera for the purpose of studying the plants of Agave and allied genera, and the plants of such Arborescent Liliaceæ as had been successfully introduced into cultivation in that part of the world. It will be recollected that in the *Kew Bulletin* for December 1889 an interesting account was published of the general characteristics of the plants of the Riviera, prepared by the Assistant Curator, Mr. W. Watson. The following notes, prepared by Mr. Baker, deal with the plants of a few groups only. They are, however, of so much general importance that the results of Mr. Baker's observation will be read with interest:—

The principal object of a visit which I made in November–December 1891, at the instigation of the Director, to the gardens of the Riviera, was to see the Agaveæ and arborescent Liliaceæ growing there in quantities in the open air. I have for some time devoted special attention to these two groups of plants, and have written papers upon them in which I have endeavoured to work out and characterise the species and varieties. In these large plants very little help can be obtained from herbarium materials, and the species have been mostly described and their range of variation studied from a small number of specimens grown in the conservatories of England, France, Germany, and Belgium. It is quite obvious that the range of specific variation is often far greater than was supposed when they were first named and characterised, and that often the descriptions have been made from plants in a state of very imperfect development. Very few botanists have attended much to these plants, so that it has often been very difficult for cultivators to obtain names for their specimens. I also wished to get any further light I could upon the differences in the climatic requirements of the species. I was kindly invited by Mr. Thomas Hanbury, F.L.S., of the Palazzo Orengo, La Mortola, who has the largest collection of these plants on the Riviera, to pay him a visit. I stayed at his house more than a week, and had therefore full opportunity of studying all the

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forms contained in his collection in a leisurely manner; and he kindly also took me to a number of other gardens at Mentone, Monte Carlo, Bordighera, and San Remo. I also went with him to Genoa to see the magnificent botanical institute which he has recently founded there, and had the opportunity of going with Professor Penzig through the Genoa botanic garden. I worked for a day making notes upon the collection in the Jardin d'Acclimatisation at Hyères, which, next to that of Mr. Hanbury, contains the largest series of forms on the Riviera. In the following paper I propose to give a complete list of the species which I saw growing in the open air, which appeared to be fully adapted to the soil and climate of the Riviera, with a summary of the notes which I made upon any points about their characters and development which are not already known and placed on record. Besides studying the plants I took note of all the names I saw, and these names were often wrongly applied. These corrections will be a great help to us at Kew in the interchange or purchase of further specimens for our collection, but it is needless, in the present paper, to enter into full details on this part of the subject. For the nomenclature and classification of the *Agaveæ* I follow my "Handbook of the *Amaryllideæ*," published in 1888, and for the *Aloineæ* and *Yuccoideæ* my paper in the 18th volume of the "Journal of Linnean Society," published in 1880.

Order Amaryllideæ.

Genus Agave, Linn.

Group Filiferæ.

A. filifera, Salmdyck. Grown abundantly all along the Riviera, from Hyères to Genoa, in a great variety of forms, flowering freely. It does not differ materially from the plant of English conservatories. It is quite clear that *A. filamentosa*, Salmdyck, is a mere form of the same species.

A. schidigera, Lemaire. La Mortola, just the plant of English conservatories. It is very doubtful whether this is more than a variety of the last.

Group Marginatæ.

A. lophantha, Schiede. Seen in various forms, both the type and *A. cærulescens*, Salmdyck, under a great variety of names, but not in flower. What is grown as "*stenophylla*" is not the plant described under that name by Jacobi, but a form of this species. I do not think *lophantha* is really distinct specifically from *A. univittata*, Haworth, which has long green leaves, with a pale band down the middle.

A. xylonacantha, Salmdyck. The true plant is grown at La Mortola, not differing materially from that of English conservatories; but I saw a great many others so called, which were wrongly determined.

A. Kerchovei, Lemaire. Grown sparingly both at La Mortola and Hyères, at the latter garden as "*A. Beaucarnei*, Lemaire," not differing materially from the plant of English conservatories. A very curious plant grown at La Mortola, under the name of "*A. Villæ*, Pirotti," is, I think, a very dwarf, spineless form of this species, identical with what has been called in England "*A. Kerchovei inermis*."

A. Victoriæ-reginæ, Moore. Seen at La Mortola, not differing materially from the plant of English conservatories. Has not flowered.

A. Gheisbreghtii, Lemaire. Seen at La Mortola, not differing materially from the plant of English conservatories.

A. Hanburii, Baker, n. sp. A new species, allied to *A. Gheisbreghtii*, seen in the Mortola collection, under the name of *A. heteracantha*. It has a sessile rosette, 8–9 inches in diameter, oblong rigid very glaucous leaves 4–5 inches long, 2½ inches diameter at the middle, with a very concave face, a pungent brown-black end-spine, a narrow continuous brown border, and close spreading colourless deltoid teeth, ¼ inch long. Flowers not seen.

A. horrida, Lemaire. Seen at La Mortola, not differing materially from the plant of English conservatories.

Group Submarginatæ.

A. Deserti, Engelm. Seen only in an undeveloped state at La Mortola.

A. Shawii, Engelm. Seen only in an undeveloped state at Hyères.

A. applanata, Lemaire. A most striking species, which I saw all along the Riviera, from Hyères to Genoa, reaching a much fuller state of development than we ever get in England. Leaves 30–40 in an acaulescent rosette, very rigid, oblong, very glaucous, reaching a length of 4–5 feet, and a breath of 4–6 inches at the middle; base very convex, 1½ inches thick; end-spine very large and pungent, decurrent along the margin a third or half way down; teeth distant, deltoid-cuspidate, dark brown, ⅓–½ inch long. It flowers freely at La Mortola and elsewhere, with a peduncle 10 or 12 feet long. *A. spectabilis*, Todaro Hort. Bot. Panorm. II. t. 25, is probably the same species.

A. Hookeri, Jacobi. A fine plant from Mexico, without a name, which had just flowered at Hyères, I referred here. It had 30–40 very thick, rigid, bright green, oblong leaves, 3–4 feet long, 6–8 inches broad at the middle, a decurrent large pungent end-spine, very broad deltoid-cuspidate teeth, and a stout peduncle, 20 feet long, with large crowded lanceolate bract-leaves, imbricating like those of *A. atrovirens*. It flowered at Kew in 1889, and was figured in the *Botanical Magazine*, tab. 6589.

A. Franzosini, Hort. Hanbury. This, which is one of the most striking plants in Mr. Hanbury's garden, was one of the things which I was desirous to see, and I find that it is an undescribed species of this affinity, which I have never seen in any English collection. It has an acaulescent rosette of 30–40 oblong-spathulate leaves, which are as thoroughly and persistently glaucous as those of *A. applanata*, reaching a length of 8–9 feet and a breadth of a foot at the middle, very rigid in texture, with a very pungent end-spine decurrent for about half a foot, and distant dull brown-black deltoid-cuspidate hooked or straight teeth, ⅓–½ inch long. It was not in flower at the time of my visit, but its huge *Euagave* panicle was produced a year ago, with a stout peduncle 40 feet long, and was described fully in a paper by Philip Sewell in Gard. Chron., 1889, Vol. II., p. 539. Mr. Hanbury tells me it was introduced to La Mortola in 1878, and probably named in honour of Francesco Franzosini, proprietor of the Villa Franzosini and a rich garden at Intra on the Lago Maggiore, which was rented for some years by the late Sir G. Macleay.

A. atrovirens, Karw. Next to *americana* and *rigida*, this is the most abundant Agave of the Riviera gardens, attaining a much greater development than it ever reaches at home. It may be recognised through

all its wide range of variation by its large oblong-spathulate dull green leaves, large decurrent end-spine, large distant deltoid-cuspidate marginal teeth, stout peduncle with crowded ascending imbricating lanceolate bract-leaves, the lower a foot or a foot and a half long, and very stout comparatively short panicle branches. I saw it in flower at Hyères, La Mortola, and San Remo. The leaves reach a length of six or eight feet, and a breadth of 15–16 inches. On the Riviera it is usually called *A. Salmiana*, but I believe that quite a dozen plants named or maintained as species by Jacobi must range here as forms.

Group Americanæ.

A. seemanniana, Jacobi. This I saw at Hyères just coming into flower, not differing very materially from the plant of English conservatories.

A. ferox, K. Koch. This species, grown in the open air at La Mortola, is developed much better than any I have seen at home. It has slightly glaucous oblong-spathulate leaves, 3 feet long, 9–10 inches broad at the middle, a large pungent non-decurrent end-spine, and very large irregular deltoid-cuspidate marginal teeth, with the edge hollowed out between them. I did not see it in flower.

A. Scolymus, Karw. Not grown commonly in the Riviera gardens, but I saw it at Hyères, La Mortola, and Monte Carlo, in flower at the last locality. *A. Verschaffeltii*, Lemaire, and several other plants which have been described as species, must clearly be placed here.

A. potatorum, Zucc. What was called by this name at La Mortola, and it may be named correctly, was clearly conspecific with *A. atrovirens* (*Salmiana*).

A. coccinea, Roezl. Grown at La Mortola, not differing materially from the plant of English conservatories.

A. mexicana, Lam. The plant grown under this name at Hyères is no doubt named correctly, but I do not think in any broad sense it is more than a variety of *americana*.

A. americana, L. Everywhere abundant along the Riviera, not in gardens only, but by roadsides, and along the sea margin, flowering very freely. Besides the type, two varieties, one of which is called *lætevirens* and *Milleri*, with very glaucous leaves, approximating towards *mexicana*, and another called *ornata* and *picta*, with green leaves with great stripes of yellow. I saw one plant of the latter with leaves 8–9 feet long and nearly a foot broad at the middle.

Group Rigidæ.

A. rigida, Miller. This, the most valuable and most variable of all the Agaves, is common and quite at home in the Riviera gardens, flowering freely; and I had an opportunity of studying its characters and range of variation far better than I had ever done before, and of seeing several forms with which I was not previously acquainted. The commonest forms in the Riviera show the characteristic small distant, nearly black teeth, and agree very well with what has been described and figured as *Ixtli* and *ixtlioides* (Bot. Mag., t. 5,893). In Dr. Hern's garden, situated just on the French side of the boundary gorge at St. Louis, I saw a form with leaves much thicker than usual (1½ inches thick at the base) and forming a less dense rosette. The plants called *Cantala* and *Rumphii* in the Riviera gardens are forms of

rigida. Mr. Hanbury has just flowered a spineless form that agrees very well with the *sisalana* of Yucatan and Florida. I am quite satisfied now that *A. Houlletii*, Jacobi, is nothing more than undeveloped *sisalana*, and the same holds good with a plant called *lævis*. One panicle of this species at La Mortola was producing copious bulbillæ. The peduncle, including the rhomboid panicle, does not reach a greater height than 12–15 feet. The bract-leaves, like those of *americana*, are small and distant as compared with those of *atrovirens*.

A. Davilloni, Baker, n. sp. This is a new species, intermediate between *rigida* and *polyacantha*, which I saw for the first time in the Jardin d'Acclimatisation at Hyères. It is acaulescent, with a rosette of about 30 rigid ensiform leaves, which reach a length of 3–4 feet and a breadth of 4 inches at the middle. They are moderately glaucous when mature, tinged with red when young, very concave on the face towards the tip, with a non-decurrent pungent point and close minute deltoid chestnut-brown marginal teeth. The peduncle was about 20 feet long, and the panicle 6 feet long and broad. The bract-leaves and flowers are like those of *A. rigida*.

A. lurida, Miller. Seen only at Hyères, not differing materially from the plant of English conservatories.

A. troubetskoyana, Hort. Hyères. A very fine plant, allied to *A. lurida*, which I saw, under this name, in the Jardin d'Acclimatisation at Hyères, is quite distinct from anything I have seen at home. It is acaulescent, with about 30 lanceolate very glaucous leaves, 9–10 feet long, 6–7 inches broad above the middle, very thick and rigid in texture, with a large pungent non-decurrent end-spine, and small distant nearly black deltoid marginal teeth. I was informed that it had been received from De Smet of Gand, and named in honour of Prince Troubetskoy, who some years ago had a very fine garden on the Lago Maggiore near Pallanza.

A. miradorensis, Jacobi. A plant which I saw under this name at Hyères, differs considerably from what we have at home, but is probably a variety of the same species. It has very glaucous lanceolate rigid leaves, 2 feet long, 4–5 inches broad at the middle, a small pungent black non-decurrent end-spine, and indistinct very small marginal teeth.

A. polyacantha, Haworth. Seen both at La Mortola and Hyères under a great variety of forms and in different stages of growth. When fully developed it has an acaulescent rosette of about 40 lanceolate leaves of firm texture, measuring about 3 feet long by 4 inches broad at the middle, green, with a slight glaucous tinge, a small non-decurrent pungent red-brown end-spine, and copious close minute red-brown deltoid marginal teeth. The peduncle is about 5 feet long, with many small scariose bract-leaves, which are linear from a broad base, and the dense spike is about as long as the peduncle. In a young state the brown horny border is quite continuous, so that it is quite probable that this may be *A. Keratto*, Miller, received by him from the island of St. Kitts. A curious form seen at Hyères has more ensiform leaves than in the type, curved forward in the plane of the face, like a sickle. Plants which I saw labelled *xalapensis*, *chiapensis*, *densa*, and *cubensis* were all *polyacantha* forms.

A. densiflora, Hook. After seeing the wide range of *polyacantha* forms just described, I cannot now separate *densiflora* as a species.

Group Striatæ.

A. striata, Zucc. Frequent in the Riviera, with a range of variation similar to what we know already at home. Here belong the plants

called *Bonapartea rigida*, *B. striata*, and *B. hystrix*, but what are called *Bonapartea gracilis* and *B. gracilis glauca* belong to *Dasylirion*.

A. dasylirioides, Jacobi. Had just flowered at La Mortola. *A. dealbata*, Lemaire, is substantially identical with Jacobi's plant.

Group Integrifoliæ.

A. Houlletii, Jacobi. As already stated, this cannot remain in this group, but is *A. rigida*, var. *sisalana*, in an imperfect state of development.

Group Geminifloræ.

A. geminiflora, Gawl. Is grown at La Mortola under the name of *Littæa geminiflora*. This does not differ materially from the plant of English conservatories.

Group Aloidæ.

A. Celsiana, Hook. Seen at Hyères only, just like the form grown at Kew.

A. mitis, Salmdyck. Gets better developed at La Mortola than any I have seen in England. Shortly caulescent; leaves lanceolate, 2 feet long, 4 inches broad at the middle, green, with a slight glaucous tinge; tip small, not pungent; teeth very minute, coloured brown in the sun, remaining green when in the shade.

A. albicans, Jacobi. Seen at La Mortola only. I do not think it can stand as more than a glaucous-leaved variety of *A. micracantha*.

A. chlorocantha, Salmdyck. Seen at La Mortola in a young state.

Group Attenuatæ.

A. elemeetiana, Jacobi. A plant seen at La Mortola, agreeing well with what we have at Kew.

A. attenuata, Salmdyck. Has lately flowered at La Mortola, with a cernuous spike 8–9 feet long, and a peduncle about half as long.

Group Yuccæfoliæ.

A. yuccæfolia, DC. Seen both at Hyères and La Mortola, flowering freely and better developed than we get it in England. Leaves linear, 3 feet long, 1½ inches broad at the middle, tapering gradually to a long point not pungent at the apex, obscurely serrulate on the margin. Peduncle wand-like, 4–5 feet long, with only a few distant small scariose bract-leaves, linear from a broad base. Spike dense, 3 feet long. Capsules very small, turbinate.

A. spicata, Cav. One of the things that interested me most at La Mortola, was to find growing in full perfection an *Agave* which cannot be anything else than this species, which was described by Cavanilles in 1802 from a plant from Cuba, which flowered in the Botanic Garden at Madrid and has not been heard of since. It is a very distinct species, nearly allied to *A. yuccæfolia*, with about 20 oblong-lanceolate leaves in an acaulescent tuft, which are bright green, 2 feet long, nearly 3 inches broad at the middle, with a small non-pungent end-spine and very close minute greenish-white marginal teeth. In the La Mortola

plant the peduncle and bracts were just like those of *yuccæfolia*, the spike 3–4 feet long, and the oblong capsule an inch long, dehiscing loculicidally to the base.

Genus Furcræa, Vent.

F. gigantea, Vent. The typical form is quite at home at La Mortola in the open air, with bright-green glossy rigid ensiform leaves, 4–5 feet long, with all the inner leaves of the rosette entire, but the outer with a few irregular teeth about the middle of the blade. I did not see *F. cubensis* or any of its allies anywhere on the Riviera, except young plants just received at La Mortola from Kew.

F. pubescens, Todaro. Seen at La Mortola in a young state.

F. Bedinghausii, K. Koch. Frequent in the Riviera gardens from Hyères to Genoa. The caudex is always short, the leaves reach a length of 4 feet, and are persistently very glaucous and scabrous on the under surface. I saw it in flower in two gardens at Mentone, producing copious bulbillæ. At Hyères it was labelled *Roezlia regia*. I do not think *F. Roezlii*, André, can be a distinct species.

Genus Doryanthes, Correa.

D. excelsa, Correa. Is grown at La Mortola and elsewhere in the open air, but I do not think it has ever flowered.

Genus Beschorneria, Kunth.

B. viridiflora, Hort. Hanbury. Leaves oblong-lanceolate, 3 feet long, 3–4 inches broad at the middle, glaucous green, scabrous on the under surface. Peduncle about 2 feet long; panicle 3–4 feet long, central branches nearly a foot long, each branch bearing at its apex a few corymbose flowers; bracts large ovate; pedicels 1½–2 inches long. Capsule oblong-trigonous, 1½ inches long, dehiscing loculicidally to the base. This is probably *B. yuccoides* (Hook. in Bot. Mag. t. 5,203) in a state of full development.

Order Liliaceæ.

Genus Yucca Linn.

Y. aloifolia, Linn. Common all along the Riviera, flowering and fruiting freely. The typical form has stems 6 or 8 feet long, green rigid ensiform leaves, 1½ feet long, 1½ inches broad at the middle, with a pungent point, a channelled face and a very scabrous margin, a short peduncle, a rhomboid panicle 1½–2 feet long, and glossy bright red-brown indehiscent oblong fleshy fruits, 2½–3 inches long, 1½ inches diameter.

Y. guatemalensis, Baker. This is one of the commonest species along the whole Riviera, in a great variety of forms, and I had the opportunity of studying it far more fully than I had been able to do before. It is usually called *Y. Draconis*, but is not the plant of Linnæus, which is founded upon a figure in the "Hortus Elthamensis" of Dillenius. It gets up to a height of 15 or 20 feet, sometimes branching from low down. I saw a tall one at Genoa with 15–20 branches, each ending in a great tuft of leaves. The leaves are always bright green, and reach a length of 3–4 feet. *Y. Gheisbreghtii* recedes from the type in the direction of *aloifolia* by its rigid scabrous leaves. *Y. Mazelii* and *Y. lenneana*, on the other hand, have less firm recurving leaves, and the

marginal toothing is sometimes very obscure, and there is a trace of a brown border. *Y. conspicua*, of the Riviera gardens, is also a form of this species, and I have very little doubt now that *Y. gigantea*, Lemaire, which I know from description only, must also range here. It produces flowers copiously on the Riviera, but never ripens its fruit.

Y. desmetiana, Baker. This is evidently a distinct species, which attains a greater size on the Riviera than with us at home, but has not been known to flower. The finest plant I saw was in the garden of the Baroness von Huttner at San Remo, 5–6 feet high, the branching stems 3 inches in diameter, the recurving leaves a foot and a half long, 1½ inch broad.

Y. Peacockii, Baker. Grown at La Mortola, but has not yet flowered.

Y. gloriosa, L. Not common in the Riviera; but I saw several forms at Hyères. *Y. pendula*, Siebold, is substantially the same as our *recurvifolia*. *Y. brasiliensis* is a form with much recurved very glaucous leaves. *Y. glaucescens*, Carrière, is a form of *gloriosa*, and quite different from Haworth's plant so called.

Y. macrocarpa, Engelm. This I saw alive for the first time at La Mortola. It was acaulescent, with a great tuft of very rigid glaucous ensiform leaves, 2 feet long, 1 inch broad at the middle, with a very pungent apex and a narrow brown margin without any threads. It has not yet flowered.

Y. treculeana, Carriere. This is grown along the whole Riviera, reaching a development far beyond anything which we have at home. In a plant at Genoa, planted 37 years ago, branching into several heads, the stem was 30 feet long, 4 yards in circumference at the dilated base, and a foot and a half in diameter some distance above the base. I feel quite satisfied that *canaliculata* and *cornuta* are forms of the same species.

Y. filamentosa, L. This is represented at La Mortola by a form which quite agrees with Haworth's *glaucescens*.

Y. albospica, Hort. Grown both at La Mortola and Hyères, in fine condition at the latter garden under the name of *Y. elata*. It is the plant described in my monograph under the name of *Y. constricta*.

Y. Hanburii, Baker, n. sp. A new species, allied to *albospica* and *fragilifolia*, the seeds of which were sent to La Mortola many years ago by Mr. Sampson Hanbury from the Rocky Mountains. It is acaulescent, with a dense tuft of about 100 very rigid glaucous-green leaves, 1½ feet long, under half an inch broad at the middle, smooth on the face, subscabrous on the back, with a pungent point, and a margin edged with brown with a white streak beyond the brown, from which a very few slender threads split away. It was not in flower at the time of my visit.

Y. baccata, Torrey. What is commonly grown as *baccata* on the Riviera is *Y. filifera*, Chabaud, which forms a trunk and inhabits Mexico, whilst the true *baccata* is acaulescent and inhabits California. I saw nothing *in situ* to equal the grand trunk which has just been presented to Kew from his garden at Cannes by M. de Falbe. I saw at Hyères a curious plant called *baccata glauca*, acaulescent, with very glaucous rigid ensiform leaves with very copious stout spreading filæ.

Y. Whippleii, Torrey. A fine plant, which has been drawn by Mrs. Thiselton-Dyer, has just flowered and died at La Mortola. I saw another which had lately flowered at Hyères, where it is grown under Lemaire's name of *Yucca californica*. I now think this had better be kept as a genus distinct from *Yucca*, under Engelmann's name *Hesperoyucca*.

Genus Dasylirion, Zucc.

All along the Riviera Dasylirions are a prominent feature in the gardens, and the soil and climate appear to suit them admirably.

D. acrotrichum, Zucc. Grown everywhere and flowers freely. Easily recognised by the leaves breaking into a tuft of threads at the top.

D. glaucophyllum, Hook. Like the last, grown all along the Riviera and flowers freely. *Bonapartea gracilis glauca* and *Dasylirion gracile glaucescens* both represent the typical form. *Bonapartea gracilis*, of the Hyères garden, differs by its bright green leaves. It may be a distinct species, but I did not see it in flower. A plant grown at La Mortola as *Dasylirion hybridum* may be the same. What I saw called *D. quadrangulatum* was all *glaucophyllum*. In a plant seen in flower at Genoa the peduncle with the panicle reached a length of 20 feet.

D. juncifolium, Hort. Hanbury. This I was very pleased to see in flower in a state of full perfection at Monte Carlo and again at Genoa. It has a great tuft of 200–300 recurving rigid linear leaves, 3–6 feet long, not more than a quarter of an inch broad at the middle, vertically striated, slightly glaucous and convex on both faces, scabrous on the margin, not splitting up into threads at the top. The peduncle is 15–20 feet long, bearing, in its upper half, dense spikes of minute whitish flowers in the axils of great scariose serrated lanceolate white bracts. Mr. Watson sent home specimens in fruit of the same plant two years ago from Hyères. It may be *D. quadrangulatum*, S. Wats., in a state of full development.

Genus Nolina, Michx.

N. longifolia, Hemsley. Grown commonly all along the Riviera under the name of *Dasylirion longifolium*. I saw it in flower at Genoa.

N. recurvata, Hemsley. Not unfrequent in the Riviera gardens under the names *Pincenictitia glauca* and *P. tuberculata*. The finest plant I saw was in the garden of the Baroness von Huttner at San Remo, with a trunk 6 feet in circumference at the base.

Genus Dracæna, L.

The only true Dracæna grown is *D. Draco*. I did not see any old trunks.

Genus Cordyline, Com.

The universal *Cordyline* of the Riviera gardens is the New Zealand *C. australis*, Hook. fil., with leaves varying greatly in breadth and rigidity. I did not see any trunks taller than those which we have in the temperate house at Kew. All the plants I saw labelled *indivisa* were forms of *australis*. At La Mortola I saw also plants of the Australian *C. stricta*, Endlich.

Tribe Aloineæ.

The Aloes were not in flower at the time of my visit, with the exception of *A. ciliaris*, Haw., which grows luxuriantly in the open air.

The commoner large caulescent Aloes of the gardens at La Mortola, Mentone, and Monte Carlo were, not, as I expected, the Mediterranean *A. vera*, Linn., but the Cape *A. africana*, *A. supralævis*, and *A. arborescens* and its variety *frutescens*. *A. striata*, Haw. (*A. albocincta*, Haw.), and its variety *A. hanburyana*, Naudin, are also frequent. I saw also at La Mortola *A. purpurascens*, the typical *A. ferox*, *A. Bainesii*, Dyer (young stems only), and *A. plicatilis*. Of the smaller species *A. aristata* is much finer than we get it in England, and this is also the case with *A. heteracantha*, Baker, which is not yet known in flower. A caulescent species, grown at La Mortola, allied to *A. arborescens*, with a dense tuft of lanceolate leaves 7–9 inches long, margined with minute teeth, at the top of a long slender erect stem, is probably new and undescribed. Dr. Penzig has lately introduced from Abyssinia to the gardens at La Mortola and Genoa, *A. abyssinica*, *A. commutata*, and three other species. Mr. Hanbury also grows *A. variegata*, and has some curious varieties of *mitriformis* and *humilis*, which are different from anything I have seen at home. He grows many Apicras, Haworthias, and Gasterias, none of which seemed materially different from what we have at Kew. A *Gasteria*, called *multipunctata*, with glossy lorate leaves 1–1½ feet long, with obscure immersed greenish-white blotches, is probably an undescribed species.

Order Bromeliaceæ.

The species which are hardy on the Riviera are *Tillandsia xiphioides*, *Puya gigas*, *Hechtia Gheisbreghtii*, *Dyckia brevifolia* (grown under the name of *D. Mazelii*), and *D. rariflora* (grown under the name of *D. remotiflora*).

It is quite evident that the climate and soil of the Riviera are admirably fitted for the growth of a large proportion of these plants. As might be expected, there is a general tendency in the leaves to be more glaucous than at home. A great many species reach their full development on the Riviera which we get at home only in an undeveloped condition. The principal groups of Agaveæ, which are not represented and are but little represented on the Riviera, are the *Aloideæ* and *Viviparæ*, and Furcræas of the *cubensis* group. It is probable that these require more moisture and perhaps more heat than they get in the Riviera climate. My best thanks are due to Mr. Hanbury for his kindness and the trouble which he took to help me in every way; and to his principal gardeners, MM. Cronemeyer and Villa, to whom, during my stay, I was constantly applying for information.

J. G. Baker.

Herbarium, Kew,
December 17, 1891.

CCXXIV.—CAPE TOWN BOTANIC GARDEN.

The Cape Town Botanic Garden, which has hitherto been under the charge of Professor MacOwan, F.L.S., as director, is about to be placed under municipal control. The character of the Institution will thereby be changed. It will "no longer be a botanical establishment," according to the *Cape Argus*, "but a town *pleasaunce* of flowers and shady walks." Professor MacOwan's services will be transferred as Government Botanist to the Agricultural Department; and it is intended also

according to the same authority, to remove to the department buildings the Cape Government Herbarium, of which Professor MacOwan is the keeper. These changes are to take effect from the 1st January 1892.

From a strictly scientific point of view these changes can hardly be regarded than those of a retrograde character. The severance of a capable scientific man from the control of the chief Botanical Garden of an important colony like the Cape, is calculated to lower the status of the Institution, and it is inevitable that its scope will be restricted to that of a "town *pleasaunce* of flowers and shady walks." It is inevitable also that it should lose its national character amongst similar institutions in other parts of the world, and its value as a means of solving important problems connected with the development of the vegetable resources of the colony, must be subservient to its functions as a municipal institution.

It is to be hoped, however, that botanical enterprise at the Cape has not so entirely died out that it may not be possible at some future time to establish a Botanical Garden, under scientific control worthy of the colony and of its vast and valuable resources. The Cape Flora is one of the most interesting in the world. A large number of very interesting and highly valuable plants belonging to this Flora are gradually becoming extinct. The opportunity for preserving them for observation and investigation will soon pass away. A National Garden, maintained by Government and under suitable scientific control, affords the most satisfactory means for preserving and studying such plants, and this duty is recognised in every important colony of the Empire. If suitable land, with the necessary climate for a Botanical Garden, could be obtained within easy reach of Cape Town, it is in every way desirable that the idea should not be lost sight of, and that the Government should recognise the duty of providing such a garden as one of the national institutions of the country.

Its economic influence, directly and indirectly, upon the development of the vegetable resources of the colony may be gathered from the results that have accrued to other colonies from similar institutions. These, however, are hardly more important than the scientific value attached to the preservation of the singularly interesting plants of South Africa. Such plants could only be successfully cultivated and preserved in an institution where they could be arranged and grown under circumstances entirely removed from the merely local interest engendered by municipal control.

The following historical account of the Cape Town Botanic Garden is taken from the *Cape Argus*, dated November 18, 1891 :—

The Botanic Garden originated in proposals made to the Government by Dr. James Adamson and a few of his friends interested in horticulture and in botany, especially Dr. Ludwig Pappe, Mr. R. H. Arderne, and Messrs. Kotzé, Clarence, Ross, Fairbairn, and Rutherfoord. Something of the same kind had been proposed long before, and discussed in the public papers, and mainly on the suggestion of James Bowie, a collector of plants sent out by the Royal Garden at Kew. Nothing resulted, however, till Dr. Adamson brought up the matter once more, and kept it before the public and the Government. The Commissioners were appointed May 5th, 1848, and immediately opened a subscription list, appointed as gardener a local nurseryman of the name of Draper, and set to work in earnest to lay out and plant up the area cut off for their use from the Government Gardens. This space then extended from the present line of Wale Street to a sunken roadway, constructed at the

instance of Sir George Grey, across the upper boundary of the garden to the top of what is now New Street. Down the western side from this point ran an irregular sluit, dry and fœtid in summer, a roaring torrent during winter rains. It was to preserve the boundary from being washed out and encroached on that the celebrated wall and its Cyclopean buttresses, which have become historic nuisances, were erected. Beyond this, from a point nearly opposite the Art Gallery, a scrubby hedge marked rather than defended the outline. A rude footway, or plank, spanned the sluit and pointed the way to Keerom Street. Draper laid out the land with some skill, seeing that it was nearly a perfect flat, and took advantage of such large trees and plants as he found existing—relics of the old Dutch gardeners, Oldenburg and Ague. But the early records show that things were done in a very primitive way. Crops of potatoes and forage were grown by Draper and his coloured labourers, and sold on the market to assist the funds subscribed, and the Government grant of 300*l.* per annum, and it was not until late in the year 1848 that the collection of plants was commenced by purchase from the executors of Baron Von Ludwig of some of the stock accumulated by him. For reception of these, a small greenhouse, of quaint and ornamental design, resembling a birdcage, was constructed. It has only recently been removed. This and other expenditure landed the Commissioners in debt. The Cape of Good Hope Bank pressed for a reduction of the over-draft, and the Commissioners began their difficulties with paper to the amount of 250*l.* They also took over the seed stock of Thomas Draper, and thus began the seed-selling business which has continued to the present year. In 1849, Karl Zeyher, the celebrated botanical collector, was added to the staff, to name and label the plants, and go round among the private gardens to obtain seeds and cuttings and to bring in bulbs and plants from the veld. He was also "to prepare a "'*Hortus siccus*' and seed collection, to instruct apprentices in theoretical "and practical botany, and attend to such visitors and strangers as "may require botanical information." This highly scientific and extensive commission was rewarded with the wonderful stipend of 7*l.* 10*s.* per month.

The pecuniary position of the place did not even allow of this small tribute to science, so inadequately was the garden supported by Government. But the garden was from the first supported by Government in a very inadequate manner, and from "Personalia of Botanical Collectors at the Cape, page 21, 8vo., 1887," we find that "The projectors found "themselves obliged in February, 1850, to dismiss Zeyher, whose quali- "fication was botanical knowledge rather than business aptitude, and find "an ordinary gardener who understood how to turn the place into a "nursery and make it pay for itself. Dr. Berthold Seeman, knowing "little of the hard necessity of the case, was perhaps more witty than just, "when he wrote in reference to Zeyher, on his visit in 1851, that the "Committee had just 'passed a resolution that their Botanic Garden "could do without a botanist.'" To Zeyher succeeded James M'Gibbon, an enterprising Scotchman, born at Elgin, and apprenticed in the Duke of Sutherland's garden there. He ultimately married the daughter of Mr. Rennie, the Duke's bailiff. A son of Rennie's had enlisted, gained the distinction of the V.C., and received a commission in a regiment proceeding to the Cape. By his influence, a place was found for M'Gibbon as Messenger to the Mixed Commission Court. After service in this capacity he returned to his original occupation at the Botanic Garden, succeeding Zeyher, but as gardener, not as botanist, March 1850. During the long period of his service up to 1881, he carried on the business of the garden with great ability and business tact on a kind of partnership system with the Committee, and accumulated a

handsome competence. Latterly he became crippled with rheumatism, and, returning to England for the benefit of medical advice, he died at Richmond, in Surrey, about 1886.

In 1857 the waste ground between the sunk-road boundary and the present college area was granted to the garden as a set-off against the appropriation of a large piece at the Wale Street end for the building of the library and museum. The cost of putting this acquisition in order, fencing, planting, and maintaining, sorely crippled the finances of the Commissioners. All the assistance given was a grant of 300*l.* from the Treasury and the services of a gang of Kafir prisoners. The gift of the ground was something like that of the historic white elephant—it was costly, and brought nothing in. There was no water supply, and a well put down by the Commissioners gave abundance of water in winter, when it was not needed, and none in the dry season. For many years the only value of the ground has been in its forming a reserve on which to deposit leaves and garden sweepings for rendering down into soil, and giving an annual supply of a few tree seeds. It has been closed to the public since 1885, when the obnoxious sunk road was filled up with soil removed in levelling the site of the Parliament House Gardens, and a new level cross-way made a little higher up. To keep it open and bring it into anything like order, would have absorbed the whole Government annual subsidy, and required separate labour gang and police supervision. It was therefore left severely alone.

Much of the present appearance of the gardens is due to Mr. M'Gibbon's labour. He raised great numbers of Australian shrubs and trees from seeds obtained from Sir Ferd. V. Mueller, and planted them, if anything too thickly in the previously bare grounds of the garden. To his industry and enterprise evidence is given by an extensive list of species under cultivation, published by him in 1858, and by numerous contributions to the local papers upon the seasonal operations of gardening. On his resignation, Professor MacOwan, who had for many years been the friend and correspondent of Harvey and Sonder, was appointed by the Commissioners in 1880, in hope of restoring the garden to a fitting status among botanical establishments. The great herbarium of Zeyher, after remaining in the possession of Dr. Pappe till 1863, had been purchased by the Government, and a portion of it ordinated by Dr. Harvey, about the year 1864. The charge of this collection which had lain *perdu* ever since its return from Harvey's temporary possession was added to the duties of the new director. The radical defect of the institution, however, was an utterly insufficient subsidy of 500*l.* per annum to meet an expenditure of about 1,400*l.* No scientific enthusiasm could supply that balance of 900*l.* It was therefore impossible for any scientific work to be done save out of business hours, and the whole energies of the staff were incessantly directed to the one object of making money enough to pay the wages and repair dilapidations. This has been done during the present régime for the last ten years, and unlike almost any similar institution in the colony, the garden is this day not one penny in debt. The director says it is mainly the head gardener's doing: the head gardener turns the statement the other way, so they are safest left bracketed as men who have, under circumstances of great difficulty and discouragement, worked together manfully in perfect mutual trust, and kept the institution going by sheer dint of industry. Professor MacOwan has for years past insisted that the selling business of the garden must inevitably drain away into the ordinary commercial channels, and that his position was utterly untenable. Any further economy was impossible, when everything had been pared down to the

quick. There was absolutely nothing to be done but to abolish his office, and reconstitute the garden on lower lines. It was no longer to be a botanical establishment, but merely a town *pleasaunce* of flowers and shady walks. The necessities of the Agricultural Department were at the same time drawing largely upon the director's time. The gardens had long been a sort of headquarters, whither came multitudes of queries and complaints on cultural matters. These now poured in from the department until it became obvious that scientific knowledge and experience were very little wanted in the garden and very much wanted outside it. This necessity, fortunately accompanied by a more liberal recognition of the higher municipal functions on the part of the town council, brought the re-constitution of the gardens within the limits of possibility. Of the Commissioners, nominally in charge of the gardens, but few remained, and these were willing to resign the title, if only they were secured from pecuniary loss in winding up their business as seedsmen, and their staff were not turned adrift after a decade of laborious years.

This is just what the new arrangement, which will come into work with the New Year, amounts to. The professional charge of the garden falls to Mr. Henry J. Chalwin, undoubtedly the most experienced horticulturist in the colony, as a department of municipal concern, just as it should have been long ago. The director will have only one more report to make, and that, we venture to say, of a different kind from the nine sharped-edged documents previously issued. He then goes over to the Agricultural Department in Burg Street, as Government botanist or consulent, or adviser, in matters belonging to his special art and mystery. Thither also, we understand, goes the Cape Government Herbarium, if, indeed, it can be got into the limited space available. Ere long, we should say, it is bound to be housed in quarters built expressly for it.

CCXXV.—GOLD COAST BOTANICAL STATION.

An account of the establishment of a Botanical Station at Aburi for the Colony of the Gold Coast was given in the *Kew Bulletin* for July 1891, p. 169.

The following further account of this station has been communicated to this establishment by the Secretary of State for the Colonies :—

COLONIAL OFFICE to ROYAL GARDENS, KEW.

SIR, Downing Street, December 22, 1891.

I AM directed by the Secretary of State for the Colonies to transmit to you, for your information, an extract from a despatch from the Acting Governor of the Gold Coast, regarding the Botanical Station at Aburi.

I am, &c.

The Director of the Royal Gardens, Kew. (Signed) ROBERT G. W. HERBERT.

EXTRACT from a DESPATCH from Mr. F. M. HODGSON, Colonial Secretary of the Gold Coast, to LORD KNUTSFORD. Dated November 9, 1891. No. 345.

2. The Botanical Station has, I find, been suffering from an unprecedented dearth of rain, the season having been drier since the cessation of the heavy rains in July than for many years past. Mr. Eyre, the Acting Curator, has however, been most energetic, and, besides having cleared and brought under cultivation an additional acre and a half of ground, has evidently worked hard to prevent the plants suffering from the want of rain. The coffee and cocoa plants looked healthy, the former more especially so, the soil being apparently well adopted for coffee cultivation. There is also a large quantity of Arnotta dye plants the seeds of which are now ready for gathering.

3. At present the only demand for plants on the part of the natives is for coffee plants, and there is no doubt whatever that the natives in Akwapuri and Krobo are beginning to plant coffee in earnest as a means of livelihood, a movement which is clearly attributable to the influence of the Botanical Station.

4. In my journey to Krobo, I was particularly struck with the large number of small coffee plantations along both sides of the road, none of which had been there in my previous journey in May 1889; and the Basel missionaries at Odumassi, the capital of Eastern Krobo, where I stayed for one night, told me that the cultivation of coffee by the Krobos was becoming universal. The missionaries have, I may state, every opportunity of acquiring accurate information on the subject, inasmuch as it is their practice to regularly visit the Krobo plantations, going from one to another, for the purpose of preaching the Gospel to the people who at certain periods of the year migrate from the villages to their farms with all their families.

5. An all-round price of sixpence per pound is obtainable in Accra by the natives for their coffee. At present the coffee thus purchased by the merchants is used for re-sale in the colony, but it is doubtful whether, when the supply more than equals the local demand, the merchants will give the same price. The price will then, I think, depend to a great extent upon the preparation of the coffee for sale in the London market, and it may become a question whether the Government should not give some practical instruction to the natives as to the best manner of preparing the bean for export.

6. It is very gratifying to find that the establishment of the Botanical Station should already have had such good practical results in the matter of coffee cultivation.

* * * * *

17. I took with me in my journey through Akwapuri and Krobo a large quantity of Egyptian cotton seed, some of which I gave to King Kwamin Fori of the former country who stated that he would have it planted in some of his own ground, and the remainder I gave to the District Commissioner to distribute in Krepi, where there are numerous native cotton plantations, and where it will be of more use, as the people of Krobo are turning their attention to coffee, and should not at present in my opinion be drawn away from it to another industry.

CCXXVI.—CHINESE GINGER.

In the *Kew Bulletin* for January 1891, p. 5, there was discussed in some detail the origin of the preserved ginger received from China. From specimens of living plants received at Kew from Mr. G. M. H. Playfair, Her Majesty's Consul at Swatow, in 1878, it was concluded that the plant yielding Chinese ginger was something different from the ordinary ginger plant (*Zingiber officinale*). The prominence given to the subject in the *Bulletin* has led to further investigation, and the fact would appear now to be established that Chinese ginger, in spite of the superficial difference in the appearance of "the large flat finger-like masses" as compared with West Indian and other commercial ginger, is undoubtedly produced by *Zingiber officinale*. The plants received from Mr. Playfair have been shown to belong to *Alpinia Galanga*, Willd.

It is probable that none of the preserved ginger received in this country is derived from the latter plant. Mr. Playfair evidently took some trouble in the matter, and he forwarded plants given him at Swatow as Chinese ginger. It is clear, however, that in some way a mistake was made in the selection of the plant desired, for which Mr. Playfair himself was only indirectly responsible. The further identification of the Chinese ginger of commerce is carefully discussed in the following papers and correspondence :—

SUPERINTENDENT, BOTANICAL DEPARTMENT, HONG KONG, to ROYAL GARDENS, KEW.

Botanic Gardens, Hong Kong,
SIR, April 9, 1891.

I WAS much interested in reading the article in the January number of the *Kew Bulletin* on Chinese ginger, but, with all due deference to the workers in the subject, I am afraid that the conclusion arrived at is erroneous. I have not seen anything which to me is evidence that *Alpinia Galanga*, Willd., is a source of Chinese preserved ginger. I have never entertained any doubt that *Zingiber officinale*, Linn., supplied the material solely used in the manufacture of preserved ginger at Canton. It may be that the appearance of the rhizomes is different from ordinary ginger as grown in the West Indies, but I am inclined to ascribe any difference between the two to the result of cultivation, and not to generic or specific distinctions. I believe that Chinese ginger is much more succulent than West Indian ginger, so much that, as I have been informed by a gentleman here who has interested himself for some years in ginger, it is impossible to dry the rhizomes sufficiently to render them fit for export in the usual commercial form, or, if it had been otherwise, dried ginger would have been exported from China long ago. The ginger used for preserving is, I believe, chiefly grown in the rich alluvial lands of the Canton delta, but the same plant when grown in mountainous districts, as I myself have seen, is much smaller, and is capable of being dried for local use, the Chinese ascribing much more valuable properties to it as a drug when grown in such localities.

I feel compelled to dismiss *Alpinia Galanga*, Willd., or any other *Alpinia* altogether from my mind as a source of preserved ginger, and I am inclined to think that Mr. Playfair when, in 1878, he sent to England a case of roots of *Alpinia Galanga*, Willd., as the source of preserved ginger, was deceived by the natives who supplied the plants.

From my somewhat extended experience with Chinese in various parts of the neighbouring empire, as well as in Hong Kong, I know how little reliance is to be placed on information supplied by the ordinary Chinaman in regard to plants. I would not withhold due acknowledgment of the usefulness of the natives in helping us to get at true information, but their aid should only be regarded as collateral; the investigator should himself sift and verify everything of importance. As bearing on this subject, I would draw attention to a passage in Mr. Playfair's letter of April 10th, 1885 (published in the *Bulletin*), where he says "it has been established as incontrovertible by Dr. Hance that the ginger plant never flowers." I have no doubt that our late much lamented friend, Dr. Hance, may have been assured by the natives over and over again that such was the case, but I have seen *Zingiber officinale* flower profusely in the Canton delta fields, as you have evidence of in the herbarium specimens which I sent to Kew a few years ago. I have often been amused by the insistance of Chinese that certain trees and plants never flowered, while not only the botanical character of the subjects alluded to contradicted my informants, but individual trees pointed out by them as never flowering have been known to me to flower regularly.

I have sent, per s.s. "Glaucus," a box containing rhizomes of *Zingiber officinale* and of *Alpinia Galanga*, Willd., the former obtained from a preserving establishment in Hong Kong, and the latter from a plant cultivated in these gardens, which Dr. Trimen sent me from Ceylon, and which was part of a plant that had been supplied to him from Kew from the consignment which had been sent to England from Swatow by Mr. Playfair, as I understand. I am convinced that when you see these specimens you will feel assured that the *Alpinia* rhizomes have not sufficient resemblance to preserved ginger either in appearance or taste to warrant the assumption that they are a source of that article. I showed a piece of the *Alpinia* rhizome to the people in the preserving establishment, and asked if that was the article they preserved; they indignantly protested against such an inference, and said the *Alpinia* was only used as a drug, but not preserved. I should not place too much reliance, as I have said, on the bare affirmation of natives, but we have the evidence of our own eyes to show that the *Alpinia* does not resemble preserved ginger.

So far as I have been able to learn, preserved ginger is made at Canton and Hong Kong only. The Imperial Chinese Customs Returns for last year show that in junks alone the quantity of fresh ginger exported from Canton to Hong Kong was over 6,000 piculs (a picul is 133 lbs.). Preserved ginger is manufactured in Hong Kong to a large extent for export to the United States. "Preserved ginger as "understood by us is not made in Swatow. What is preserved there "is made for native consumption, to be used medicinally or for cooking, "and is exported largely to the Straits Settlements, and never to "Hong Kong. This kind of ginger is called Ng Mai Keung." This, I understand, is an *Alpinia*, but it does not resemble the Canton ginger, and is, I believe, not preserved in syrup. The rhizomes of true ginger, Alpinias and Curcumas are all classed generically by the Chinese under the name Keung. *Alpinia Galanga*, Willd., is Leung Keung; *Zingiber officinale*, Linn., Taiyeuk Keung; and *Curcuma* (turmeric), Wong Keung; and so on with other species. Now, I think that the native name of Keung, and the fact that the preserved ginger under consideration is not made at Swatow—which is 200 miles from Canton—will afford a probable explanation of some apparent mistake made when Mr. Playfair sent home what has been called "Chinese Ginger,"

which mistake, supposing that one has been made, has resulted in the dissemination of what appears to be misleading information.

I have taken the first opportunity I have had since the receipt of No. 49 of the *Bulletin* of furnishing you with this information, which I am sure you will be glad to receive.

I am, &c.

(Signed) CHARLES FORD.

W. T. Thiselton Dyer, Esq., C.M.G., &c.,
Royal Gardens, Kew.

EXTRACT from the ANNUAL REPORT on the BOTANICAL and AFFORESTATION DEPARTMENT (HONG KONG) for the year 1890, by CHARLES FORD, F.L.S., Superintendent.

The conclusion arrived at in the article in the *Kew Bulletin* is that Chinese preserved ginger is not obtained from the ginger plant, *Zingiber officinale*, Linn., but from the rhizomes of *Alpinia Galanga*, Willd. The evidence which has led to this conclusion seems to be that Mr. PLAYFAIR sent from Swatow to Kew a case of plants, alleged to be Chinese ginger and which have turned out to be *Alpinia Galanga*, Willd. This evidence, however, has, I fear, afforded nothing of value, except of a negative nature, towards proving the source of preserved ginger. In my opinion nothing is really needed, as I cannot see anything in the preserved ginger which would lead me to suppose that it is anything except the rhizomes of the ordinary ginger plant, *Zingiber officinale*, Linn., which is cultivated so extensively by the Chinese in the neighbouring provinces. In 1886, when travelling through the delta south of Canton, I saw ginger extensively cultivated and flowering freely in the rich alluvial lands. I obtained complete specimens for the herbarium, and they were without doubt the true ginger plant.

The Chinese ginger is apparently more succulent, and the rhizomes are of a larger size than the West Indian article, but there is no specific distinction in the plant.

I cannot but think that Mr. PLAYFAIR, while endeavouring to render a useful service, was the innocent agent of a wrong conclusion having been arrived at through the natives who supplied him with the plants, which were sent to Kew, having brought in the wrong kind. The natives themselves were also probably innocent of any intention to deceive, a mistake possibly having arisen from the Chinese name of true ginger being a generic name applied to different species, and even to different genera of plants. The rhizomes of true ginger and of *Alpinias* and *Curcumas* are all classed generically by the Chinese under the name "Keung." *Zingiber officinale*, Linn., is "Tai Yuk Keung"; *Alpinia Galanga*, Willd., "Leung Keung"; and *Curcuma* (turmeric), "Wong Keung." It is obvious, when these names are considered (as for brevity the word "Keung" only is often used), how easily a mistake may have occurred when dealing with a native engaged to procure roots. There is also another fact to show that the plants sent from Swatow would not be likely to afford evidence of much value in the investigation of the source of Chinese ginger. This article is not preserved at Swatow (which is 200 miles in a direct line from Canton), and it is not likely that it supplies raw material for preserving in the large establishments of Canton and Hong Kong, as there is no information to show that it is exported to these places. I believe Canton and Hong Kong are the only places where this preserve

is made. It is not generally known that the Hong Kong preserving establishments export largely to the United States. Of fresh ginger, junks alone carried from Canton to Hong Kong over 6,000 piculs (357 tons) last year.

The information on "Chinese ginger" furnished by the *Kew Bulletin* having reached China, and, as I understand, having been accepted, it will be useful to put on record this additional information on the subject, and to stimulate further inquiries by those who may have opportunities of affording authentic information and finally disposing of the question.

PERCY GROOM, Esq., F.L.S., to ROYAL GARDENS, KEW.

Whampoa, China,

DEAR SIR, November 19, 1891.

I THOUGHT you would be interested in having an account of some work I have done in relation to the source of Chinese ginger.

I told Gardiner some time ago that I had proved by an anatomical examination that Chinese ginger is not *Alpinia Galanga*, and he may have told you—but I deferred sending information direct to you till I could disprove or corroborate Ford's view that Chinese ginger is derived from *Zingiber officinale*. There is no shadow of a doubt concerning the correctness of his views, and he certainly explains the origin of the error. All the zingiberaceous plants known to the Chinese are termed "Keung," which I should think would preferably be translated by some such word as "Gingerwort." Ordinary ginger is "Tai Yuk Keung" (large flesh ginger); candied ginger is "T'ong Keung" (sugar ginger); dried ginger is "Kon Keung"; Galangal is "Leung Keung" (mild ginger); Curcuma is "Wong Keung" (yellow ginger). In addition I find in the dictionary the following phrases which I cannot personally guarantee: "Shang Keung," raw (edible) ginger; "Tsz Keung," tender shoots of ginger (edible). By officials whom I requested to ascertain all about the varieties of "Keung," I was informed the "Shang Keung" and "Tsz Keung" were the same plant, but were varieties, one being cultivated in a dry and the other in a wet soil. This is a good example of the variety of information one can extract from Chinese and from a dictionary. The dictionary gives "Ko Leung Keung" as the zedoary.

Believe me, &c.

(Signed) PERCY GROOM.

P.S.—Please utilise the information concerning Chinese ginger as you may think fit.

[Enclosure.]

Recently it has been suggested in the *Kew Bulletin* that Chinese ginger is the rhizome of *Alpinia galanga*.

Mr. Ford, in his annual report for the Botanical and Afforestation Department of Hong Kong for 1890, casts doubts on the conclusions thus arrived at.

To decide the question, I first obtained preserved ginger (dry, and in syrup), and I bought the natural ginger from street vendors. The specimens thus procured all agreed in structure, but they differed from *Alpinia Galanga* obtained from Mr. Ford (a cutting of the original plants sent from Swatow).

I then caused inquiries to be made concerning the manufacture of preserved ginger. The manufacturers stated that only one sort of plant-rhizome was employed (Tai Yuk Keung), and no other sort of rhizome was ever mixed with it. In particular they stated that no variety of galangal rhizome (Leung Keung) was ever used in the manufacture of ginger.

Hence so far it was safe to conclude that whatever Chinese ginger might be, it could not be *Alpinia Galanga*.

It remained to test Mr. Ford's view that *Zingiber officinale*, Linn., was the source of Chinese ginger. At the end of October I ordered the head gardener of the College gardens at Whampoa to procure flowering specimens of the plant from which Chinese ginger (Tai Yuk Keung) was obtained. The flowering specimens thus obtained turned out to be a *Zingiber;* and Mr. Ford informs me that they are specimens of *Zingiber officinale*, Linn. I also had fresh ginger purchased in the market by my servants (for at that time of the year the manufacturers of preserved ginger have no fresh ginger). This agreed precisely in structure with the zingiber rhizome; and in both these rhizomes the starch-grains were alike (flattened discoid for the most part) and utterly different from the elongated club-like, almost rod-shaped, grains of *Alpinia Galanga* (Hong Kong specimen). These two rhizomes also agreed in structure with those obtained earlier in the year, viz., the preserved and the natural ginger.

Finally I endeavoured to purchase other sorts of fresh zingiberaceous rhizomes in October and was unable to procure any. In all cases I was informed that the medicinal zingiberaceous rhizomes, and those used in flavouring, &c., came from distant parts, and that only the ginger for preserving grew in the immediate neighbourhood. But without relying on this evidence, except confirmatory, it is safe to conclude that Chinese ginger is the rhizome of *Zingiber officinale*, as shown by anatomical observations, inquiries from the Chinese and observations on the flower. Mr. Ford, in his report, said: "The "Chinese ginger is apparently more succulent, and the rhizomes are of "larger size than the West Indian article, but there is no specific "difference in the plant."

It is well known that zingiberaceous rhizomes vary in structure according to the circumstances under which they are cultivated; for example, in hot-houses, the sclerenchyma in the rhizomes of *Zingiber officinale* and *Hedychium carneum* is replaced by collenchyma, and other changes are visible. Hence I can only suppose that Professor Perceval Wright was unaware of these variations, or did not allow sufficient margin for them, in the histological observations which he surely must have made before allowing himself to say "that the large flat ginger-"like masses sent to this country from China differed from any-"thing that the ordinary ginger plant (*Zingiber officinale*) could "produce."